

GEOCHEMICAL CHARACTERS AND EVOLUTION OF MAFIC- ULTRAMAFIC ROCKS IN SOUTHWESTERN PARTS OF DALTONGANJ, PALAMAU DISTRICT, JHARKHAND, INDIA: EVIDENCE FOR PLUME MAGMATISM

Jugnu Prasad¹ and D. K. Bhattacharya¹

¹*Dept. of Geology, Ranchi University, Ranchi (Jharkhand)*

E-mail: jugnuprasad3476@gmail.com, dkbprof78@gmail.com

Abstract

In the southwestern part of Daltonganj town in Palamau district of Jharkhand, the occurrence of komatiite spatially associated with rocks of tholeiitic parentage has been recorded at a number of places near Semra (24°00'02"N: 82°50'20"E)-Salatua (24°04'01"N:83°50'20"E) sector. The area is located at the northwestern fringe of the Chotanagpur Gneissic Complex (CGC) adjacent to the Garhwa-Daltonganj Gondwana Basin (GDGB) in the north and in the Auranga-Koel Gondwana Basin (AKGB) in the south. The mafic-ultramafic magmatism in close proximity to major intracontinental rifts/shear zones suggests their emplacement under extensional tectonic regime. Based on field observations, komatiites are classified as spinifex - textured and cumulate komatiites. A considerable population exhibits cumulus texture. Chemically, they are characterized by high MgO, Ni, Cr and low in alkali, TiO₂, Ba, Cs, Rb, Nb, Hf and Y. They are Al-undepleted in character and have near chondritic Al₂O₃/TiO₂ ratios. They exhibit almost flat HREE and variable LREE depletion with (La/Sm)_n less than 1, (Gd/Yb)_n varying from 0.87 to 1.1 and (La/Yb)_n ranging from 0.83 to 1.09. Different chemical characters and interelemental ratios suggest that they are comparable to Munro-type komatiites.

Mafic rocks representing Mg-Fe rich tholeiites are spatially associated and interdigitated on a scale of 10's to 100's metres with komatiites. They have near- flat REE distribution pattern over a continuous range. Mg#, Cr, Ni decrease with increasing REE, Nb, Zr, Hf and Y. The diverse magmatism is interpreted to represent partial melting in the outer envelope of the mantle plume from which komatiitic liquids were generated. Chemical features suggest that plume from which the komatiitic and tholeiitic magmas were derived was diverse in nature.

Keywords: Semra-Salatua sector, Jharkhand, India, Chotanagpur Gneissic Complex, Komatiite, Tholeiite, Extensional tectonic regime, Plume.